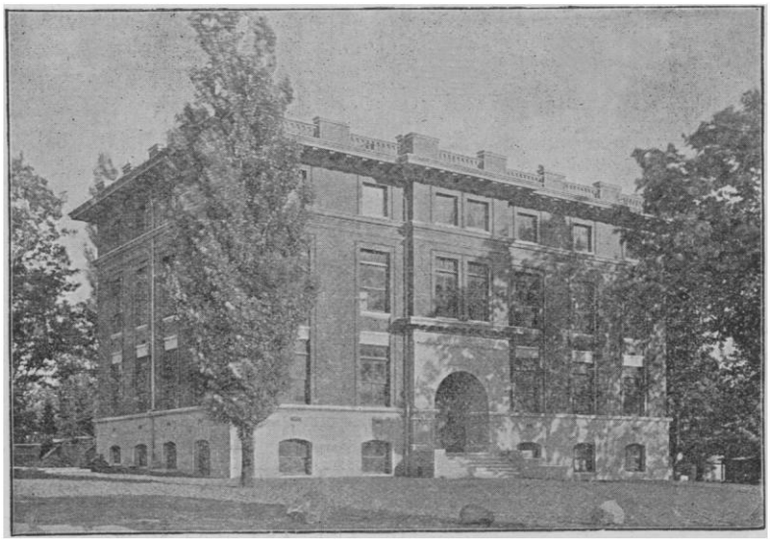
THE McMILLAN CHEMICAL LABORATORY.

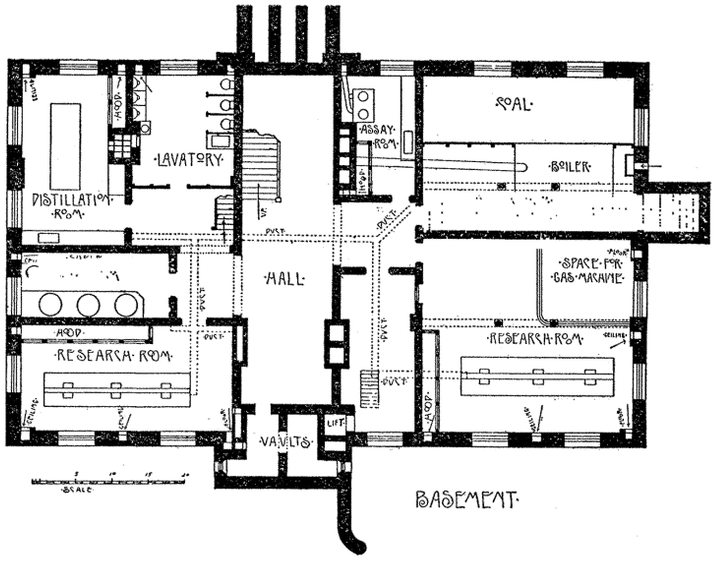
BY DELOS FALL, ALBION, MICH.

THIS building, the generous gift of Senator James McMillan, is now completed and will be devoted exclusively to the Department of Chemistry. It was dedicated Nov. 15 with appropriate exercises, addresses being delivered by Professor A. B. Prescott, of Michigan University, Professor H. H. Donaldson, of Chicago University, Senator McMillan, Professor Washington Gardner and others.

The plans were drawn by Mr. E. W. Arnold, architect, of Detroit; the building was erected by the firm of Wallace & Morris, builders and contractors, of Detroit.



The cut of the exterior and the floor plans here presented will give the reader a general idea of the structure. The general form of a building that would best suit the requirements of the various departments was found to be a rectangle, 52×88 feet. This is divided into two parts in each story by a hall 13 feet in width. This provides a wide, recessed entrance on both sides of the building.



There are three stories and a basement, all abundantly lighted by high and broad windows.

All outside and inside walls are of brick. The entrances, sills, lintels, copings, etc., are cut stone, the cornices of galvanized iron. The foundations are of stone. From the ground to the first story window-sill, the outside is faced with cut stone ashlar in courses.

The exterior treatment is colonial in character, which will give to the building a quiet dignity and, at the same time, perfect appropriateness to the purposes for which it is erected.

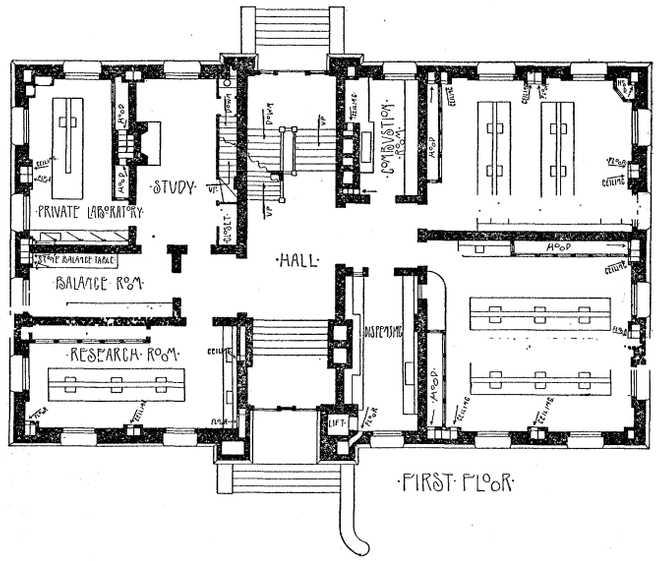
The basement story is 10 feet high and contains a boiler and fuel room, an assay laboratory with three furnaces and a fire table; a hall, a fire-proof storage vault; a research room, fitted with tables, ventilating hoods, etc.; a room for large gas tanks holding oxygen and hydrogen; a distilling room, with fire-proof tables, hoods, etc.; a lavatory, a storage room, and a second large research room.

In the first story, which is 13 feet high, there is, on one side of the hall, the organic laboratory, 27×30 feet, containing tables for 24 students, with 29 feet of hoods, also wall tables, cases for chemicals, etc. Adjacent to this is the quantitative laboratory, 22×30 feet, with tables for 20 students, hoods, wall tables, etc.; a combustion room, 10×17 feet, and dispensing room, 10×21 feet.

On the other side of the hall is the instructor's study with a private stairway to the basement and the lecture room above. This is furnished with book cases, fire place,

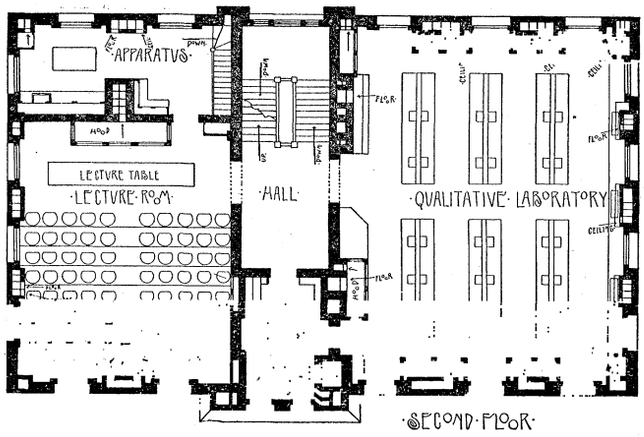
wardrobe, etc. Off this is a private laboratory, with large table, hoods, wall tables, cases, etc. The balance room, 9×21 feet, and a research room, 15×30 feet, complete the equipment of this floor.

bowl, gas, water and waste pipes at convenient intervals, hydrogen and oxygen from the tanks below, electric connections with dispensing and assistant's rooms, a plunge battery, etc.



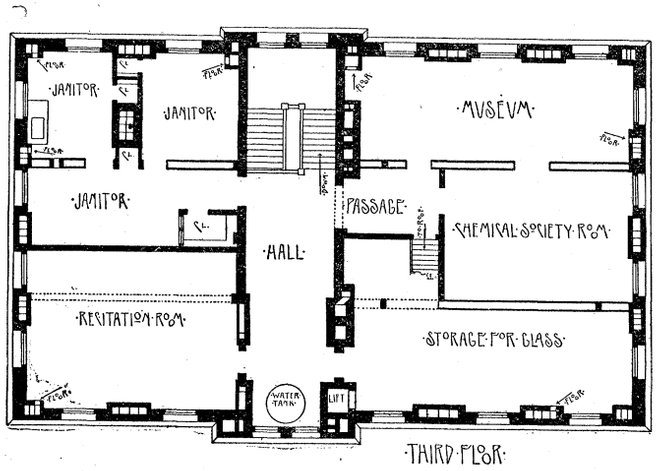
The second story is also 13 feet high and contains the qualitative laboratory, 40×49 feet, with tables for 80 stu-

Behind the lecture table is a hood 14 feet long, double counter-balanced blackboards, a rolling stereopticon cur-



dents, with 7 hoods, wall tables, cases, etc. The lecture room, also on this floor, 30×37 feet, will accommodate 82 students, the seating being arranged in rising tiers of

tain, etc. Off the lecture room is an apparatus and preparation room, which will also contain cases for lecture table apparatus.



chairs. This room also contains an elaborately furnished lecture table, provided with a large pneumatic cistern, a powerful down draught for handling noxious gases, wash

The third story is 10 feet high and contains a chemical museum, a class room, a chemical society room, three rooms for janitor's residence, store rooms, etc.

The heating is by steam, direct radiation, and in addition to this there are encased radiators recessed under the windows with register openings through the wall. By this means a supply of warm, fresh air is admitted to each room, which can be fully controlled.

The ventilation is by large ventilating flues and groups of flues arranged so as to ventilate all parts of the building and at points where most needed. The flues are in three sets, viz.: for floor ventilation, for ceiling ventilation and for hood ventilation, each set independent of the other and yet each working in combination with the other, and all controlled independently. Steam heat is applied in all flues in the upper story, which will insure their proper working.

The Laboratory is supplied with gasoline gas from a machine of 400 Bunsen burner capacity. Each student's table is provided with two gas and two water cocks, wash bowl, two drawers, cupboards and shelves. The gas and water are also distributed to all hoods, dispensing rooms, etc.

THE GRADUAL DISAPPEARANCE OF THE RANGE GRASSES OF THE WEST.

BY I. W. TOURNEY, TUCSON, ARIZ.

In the early days of our great West almost the only method of travel from the Mississippi Valley to our western coast and intervening points was by caravan. Wagons drawn by horses or cattle were several months in making this journey. During this time the stock subsisted entirely upon the natural forage afforded by the country traversed. For the most part, this forage was perennial grasses, which at that time were everywhere abundant. Then the whole of the West was a great pasture, unstocked, save for the herds of buffalo, deer and antelope. Many regions which were covered with a luxuriant growth of nutritious grasses are now entirely destitute of vegetation, if we exclude a few straggling, stunted bushes and the yearly crop of annuals which follow the summer rains. As a more specific case, the rancher who drove the first herd of cattle into Tonto Basin, in central Arizona, found a well-watered valley, everywhere covered with grass reaching to his horse's belly. In passing through this region a year ago scarcely a culm of grass was to be seen from one end of the valley to the other. This transformation has taken place in a half-score of years.

The important native forage grasses are perennials, many of them of the great western genus *Bouteloua*. Their growth in all parts of arid and semi-arid regions is slow. The grasses which formerly covered so great an area of our West were years in developing their root systems, and, in not a few species, even the culms were of several years' growth. When only cropped by the deer and buffalo they were able to hold their own against the drought and other agencies of nature. By stocking this great western country with the herds of civilization, these grasses were mowed down before them like timber before the forest fire. They are gradually becoming less and less, and it is only a question of a few years when, in many regions, they will disappear as a material factor in the natural forage of the country. Regions long distances from water, out of reach of the great herds of cattle everywhere on the un-fenced domain of each western state and territory, are yet well-covered with perennial grasses. Last year in passing over a large unwatered area north of Prescott miles of country were found covered with grass, while in much more favored localities in the vicinity of water these species have entirely disappeared.

Cattle men are putting down wells in many of the unwatered regions and moving their herds thither. The first year the forage is excellent, the next year it is not so good, and the third or fourth year it becomes so poor that the well is abandoned and another sunk in an as yet unfed locality. The more arid the region the more disastrous is the effect of overstocking. When stock are driven into a locality they are allowed to increase, not in proportion to the amount of forage that the given range is in condition to furnish year after year, but as many are grazed as can find feed for the time being. No consideration or thought is expended on the future. This condition of things has been most disastrous to stock-men throughout the West. To within a few years the efforts of cattle-men were expended in increasing the size of their herds, and this continued until nearly every vestige of the perennial grasses was swept away. Since that time cattle have died by thousands, the assigned cause in most cases being cold weather or drought, when in reality it has been the lack of forage; the direct result of stocking the range to a greater extent than the natural conditions year after year will justify.

Many are deceiving themselves in thinking that a few rainy seasons will bring back the rich perennial grasses of the years gone by. It seems to me, under the present condition, the time can never come when our western range will be as rich in forage as it was ten or more years ago. Under the most favorable conditions, with cattle entirely excluded, it would take many years for these grasses to get the foothold that they formerly held.

The annual grasses, mostly the smaller *Boutelouas* and *Aristidas*, are not so disastrously affected by overstocking. They seem to be always on hand to cover the plains with verdure after the rainy seasons. They furnish excellent forage during the short period that they are at their prime, but at the most they can only provide feed for three or four months of the year. The ranchman makes a marked distinction between the annual and perennial grasses. He aptly designates the annual as "seed grasses" and the perennial as "root grasses." The seed grasses soon become worthless, their bleached, short culms are broken and beaten into the sand by storm and wind. The root grasses retain their vitality and remain green for the greater portion of the year. Even when dry, their harder, stronger and larger culms contain as much nutrition as well-cured hay, and are, or rather used to be, the valuable winter forage of the West.

In conclusion, there is a limit beyond which no range can be profitably stocked. If we exceed this limit it will not only be detrimental to the permanency of the range, but in the end will be disastrous to the stock as well. It is but natural that a growth of top is necessary to a growth of root, therefore if the tops be continually cropped to the ground, the roots will finally perish. This is especially true of grasses of arid regions, growing in bunches or scattered about here and there a few culms in a place. The range is frequently fed so close that few of the better grasses mature seeds, while many others are tramped out by horses and cattle. During the past few years the effect of over-stocking has shown itself in the inferiority of the cattle when compared with those of former years. They are poorer as a consequence of their increased number and the resulting deterioration of the range.

—The essays received by the Canadian Institute in the competition for a prize for the best act "which, if made law, would give the whole Canadian people equal representation in Parliament," have been issued to the final tribunal of judges. Their reports are returnable on March 15 next; immediately thereafter the awards will be announced.